

Translation

PATENT COOPERATION TREATY

PCT/EP2003/007830



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 55148 Mü/lu/tp	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/007830	International filing date (day/month/year) 18 June 2003 (18.06.2003)	Priority date (day/month/year) 20 August 2002 (20.08.2002)
International Patent Classification (IPC) or national classification and IPC G01C 19/72		
Applicant LITEF GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 05 March 2004 (05.03.2004)	Date of completion of this report 09 June 2004 (09.06.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/007830

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description: _____, as originally filed
pages _____ 1-5
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims: _____, as originally filed
pages _____ 1-3
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the drawings: _____, as originally filed
pages _____ 1/2-2/2
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description: _____, as originally filed
pages _____
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).
** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/007830

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-3	YES
	Claims		NO
Inventive step (IS)	Claims	1-3	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-3	YES
	Claims		NO

2. Citations and explanations

See supplemental sheet

Re Item V: Justified finding in accordance with
Article 35(2) with regard to novelty,
inventive step and industrial
applicability; documents and statements to
support this finding:

1. **Technical field:**

The invention relates to a method for
determination of and compensation for the scale
factor error caused by changes in the wavelength
in a fiber-optic gyroscope (FOG).

2. **Independent claims:** Claim 1 (method).

3. **Prior art:**

The following documents are cited:

D1: US-A-5 067 084; SHING P. KAU;
November 19, 1991

D2: EP-A-0 288 032; SLI AVIONIC SYSTEMS CORP;
October 26, 1988

D3: US-A-5 365 338; MICHAEL D. BRAMSON;
November 15, 1994

Document D1, which is regarded as the closest
prior art, discloses an inertial track and
attitude reference system with a gyro sensor (for
example including a fiber-optic gyroscope (FOG)).

The scale factor error in the system is
determined, and the values of the error signal can
be filtered by means of a Kalman filter.

Document D2 describes the determination of the
scale factor error of an FOG, with a Kalman filter
also being used for signal processing. **Document D3**
discloses a FOG in which a scale factor correction
is carried out on the basis of a wavelength-
dependent scale factor error.

4. Novelty and inventive step - Articles 33(2) and (3) PCT

4.1 Independent Claim 1:

5 The subject matter of the independent Claim 1 differs from the closest prior art according to the document D1 in that the scale factor error which is determined for an axis with fast motion dynamics is used as the Kalman filter correction value for the scale factor error correction for
10 all measurement axes of the FOG. The subject matter of Claim 1 is thus novel in comparison to the document D1. All the other documents are less relevant.

15

The Kalman filter correction value determined in this way achieves the objective technical object of improving the scale factor accuracy of an inertial track and attitude reference system
20 having a multiple axis fiber-optic gyroscope with a common light source. A method such as this is neither known nor obvious from the cited prior art. The requirements of Article 33(3) PCT are thus satisfied.

25

4.2 Dependent Claims 2 and 3:

The dependent Claims 2 and 3 relate to features in addition to the independent Claim 1, to which they refer, and for this reason are regarded as novel
30 and inventive.

5. Industrial applicability - Article 33(4) PCT

The invention as claimed in Claims 1 to 3 is industrially applicable in the field of inertial
35 track and attitude reference systems having a multiple axis fiber-optic gyroscope.

6. Specific faults with the international application

The features of the claims have not been provided with reference symbols in brackets (Rule 6.2 b) PCT).

5

In order to comply with the requirements of Rule 5.1(a)(ii) PCT, the documents D1 to D3 should have been named in the description; the relevant prior art contained in them should have been briefly outlined.

10